**T001-30**

**Differential Response of Radial Versus Longitudinal Myocardial Velocities to Dobutamine Stress: Noninvasive Measurement by Tissue Doppler Imaging**

Linda B. Pauliks, Michael F. Vogel, Andrew N. Reddington, Christopher F. Madler, Ian R. Williams, Alan G. Fraser, University of Colorado Health Sciences Center-The Children’s Hospital, Denver, CO, Wales Heart Research Institute, United Kingdom

**Background:** In heart failure, longitudinal myocardial velocities fall first while radial shortening is preserved longer. Dobutamine stress MRI also demonstrates a greater functional reserve of circumferential vs. longitudinal fibers. This study used tissue Doppler imaging (TDI) to compare the stress response of radial and longitudinal velocities. **Methods:** From the Myocardial Doppler in Stress Echocardiography database 104 TDI studies were selected based on absence of coronary artery stenosis on angiogram and completion of the 30 mcg/kg/min dobutamine stage. The peak systolic velocity was determined in the basal lateral (longitudinal=L) and posterior segment (radial=R). The ratio of the velocities in the 2 segments (R/L ratio) was calculated. Linear regression and t-test were used (p<0.05). **Results:** The baseline R/L ratio was 0.80±0.37 and it increased to 0.98±0.41 (p<0.01) at 10 mcg/kg/min of dobutamine without additional rise at higher doses. In 83 patients with a baseline R/L ratio <1 the increase was 36% (Figure). The group with a baseline R/L ratio >1 had a similar heart rate and blood pressure response but no further increase of the R/L ratio with stress. **Conclusions:** Tissue Doppler imaging can be used to quantify the increased recruitment of radial versus longitudinal myocardial velocities with stress. Experimental studies have previously shown a greater functional reserve of circumferential vs. longitudinal fibers. The R/L ratio may therefore be useful to detect abnormal function in early heart failure.

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**T001-33**

**Incremental Prognostic Value of Stress Echocardiography Over Historical, Clinical, and Stress Electrocardiographic Variables Across a Wide Spectrum of Bayesian Pretest Probability for Coronary Artery Disease**

Sriraj Banerjee, Siu-Sun Yao, Randy Cohen, Muhammad Z. Saeed Malik, Azem Saeed, Ranju Sinn, Asif Malik, Farooq A. Chaudhry, St Luke’s-Roosevelt Hospital Center, New York, NY

**Background:** Stress echo is an established technique for the diagnosis of CAD. However, data on incremental prognostic value of stress echo over historical, clinical, and stress EKG variables in patients with known or suspected CAD is limited. **Methods:** We evaluated 1560 patients (59±13 yrs, 51% male) undergoing stress echo. Patients were grouped into low (<15%), intermediate (15-85%) and high (>85%) pre-test likelihood using standard software, CADENZA. The historical, clinical, stress EKG and stress echo variables were recorded for the entire cohort. Followup was obtained.

**Results:** For the entire cohort, an ischemic stress echo study confers a 5.0 times higher sensitivity and specificity of 83% and 100%, respectively, for the detection of >50% coronary stenosis. **Conclusions:** Stress echo yields incremental prognostic value over historical, clinical, and stress electrocardiographic variables across wide spectrum of bayesian pretest probability subgroups.

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**T001-34**

**In Vivo Microbubble Binding to Inflammatory Endothelium via Selectin Targeting by Sialyl Lewis X**

Eric Li K. Lee, Eric M. Tom, Matundu M. Felix, Joan Gretton, Rekhi P. Varghese, William R. Wagner, Florindella S. Villanueva, University of Pittsburgh, Pittsburgh, PA

We have previously shown that ultrasound microbubbles conjugated to a monoclonal antibody against intercellular adhesion molecule-1 (ICAM) selectively adhere to inflammatory endothelium overexpressing ICAM, and that such adhesion can be echocardiographically imaged in vivo. Because exogenous antibodies are costly and immunogenic in humans, we sought to identify an alternative targeting moiety to ultrasoically image endothelial dysfunction. Sialyl Lewis X (sLex) is a tetrasaccharide found on leukocyte surfaces that specifically binds to selectins, adhesion molecules overexpressed by inflamed endothelium. We hypothesized that sLex microbubbles would bind to activated endothelium in vivo. **METHODS:** Fluorescent lipid-encapsulated perfluorocarbon gas bubbles (2.1–4.0 µm) were conjugated to either sLex, anti-mouse ICAM antibody, or non-specific IgG using biotin-avidin chemistry. Anesthetized mice were given intracardial TNF-alpha to stimulate ICAM and selectin overexpression, and 5 h later the inflamed cremaster muscle was mounted on an intravital microscope. sLex bubbles were intravenously injected and the number of bubbles adhering to microvessels in 20 random fields was measured 7 min later. Bubble adhesion in digitized histologic sections of lung tissue was quantified post-mortem using automated videodensitometry. **RESULTS:** sLex binding to inflamed endothelial cells varied by targeting moiety: Compared to control IgG-bubbles (1 ± 0 bubbles/field, n=4 mice), adhesion was greater with sLex (5 ± 4/field, p<0.04) and ICAM (5 ± 2/field, p<0.006, n=5 bubbles). Histology showed sLex binding to ICAM of ICAM bubbles that was greater than sLex bubbles (p<0.04). **CONCLUSIONS:** Attachment of the carbohydrate sLex to the bubble shell confers binding to inflammatory endothelium that is comparable to ICAM-targeted bubbles. Differential lung retention as a function of targeting ligand and its effect on net availability of bubbles require further study. sLex is a promising, naturally occurring ligand that may prove useful for targeted imaging of dysfunctional endothelium in humans.